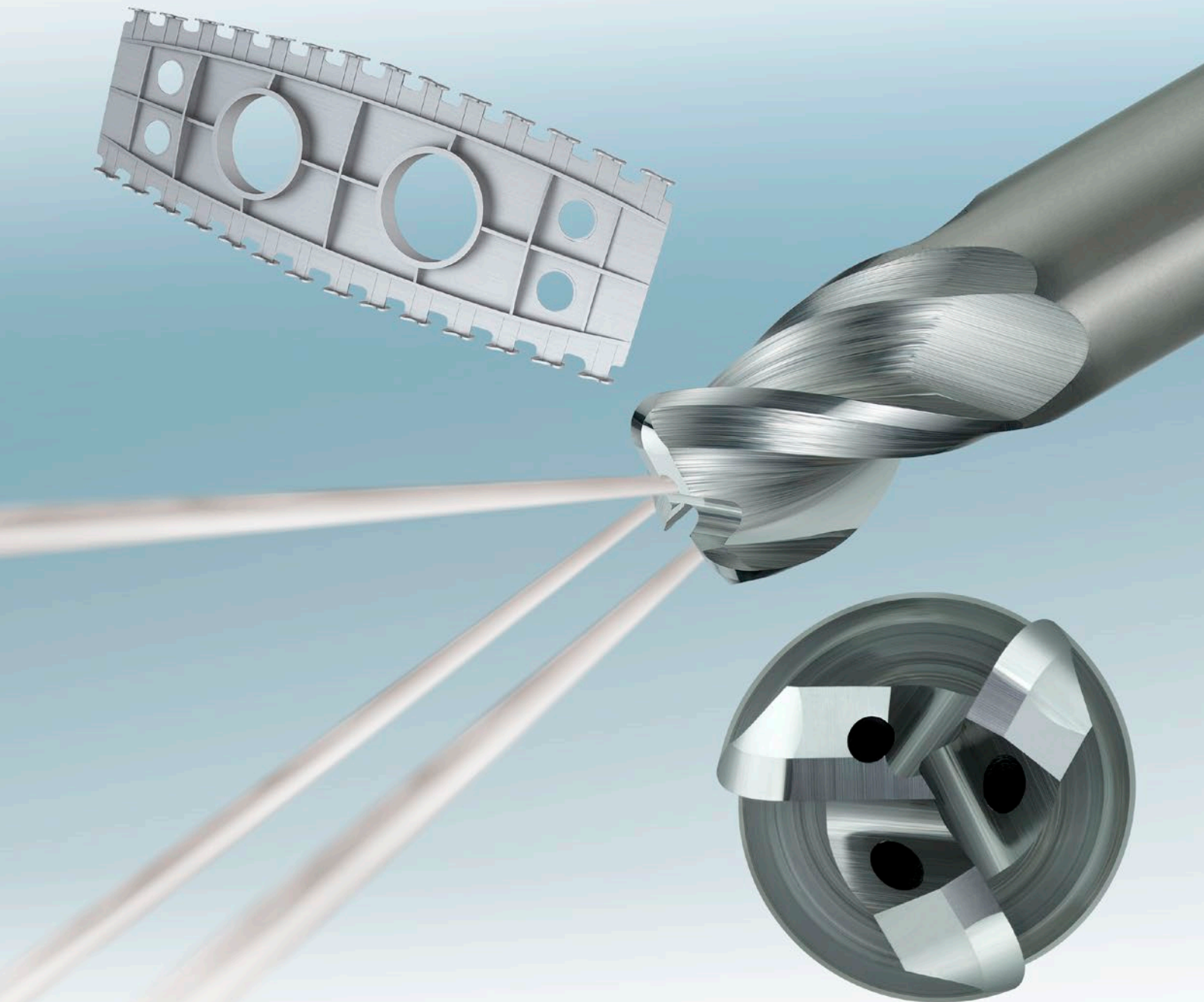


High Efficiency Machining of Aluminium Alloys

New **Alimaster**

New
Products

**Optimised Cutting Edge Geometry and
Through Coolant Holes. Ideal for Ultra Efficient
Machining of Aluminium.**



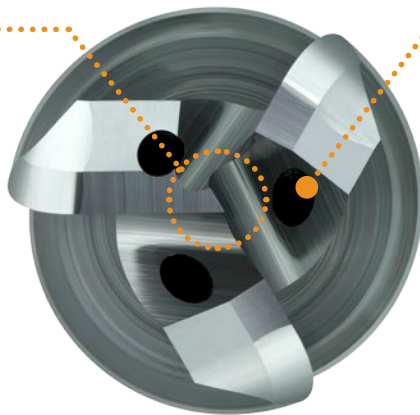
*By CG image

New Alimaster

Helical internal through coolant holes, together with optimised cutting edge geometry enables highly efficient machining.

Strengthened Centre Cutting Edges

Optimised centre cutting edges provides strength and reliability even during plunging.



Use of Helical Coolant Holes

Chip discharge during plunging, ramping and grooving have been significantly improved, for stable, high efficiency cutting. Helical holes maintain a stable coolant supply even after re-grinding.

Ideal Flute Geometry

The cross sectional geometry of the flutes is perfect for efficient chip discharge and prevents chip jamming commonly associated with high feed machining of aluminium.

Square End Mill, 3 Flute

A3SA

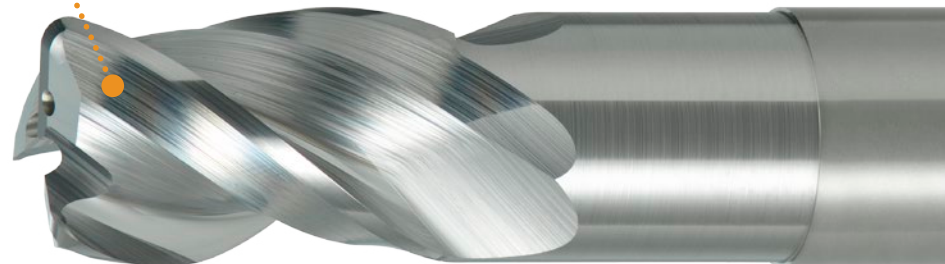


Irregular Helix and Curved Flute Exit Geometry

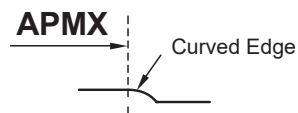
Suppresses chatter to enable excellent surface finishes.

Radius End Mill, 3 Flute

A3SARB



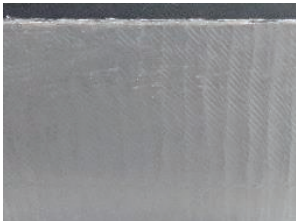
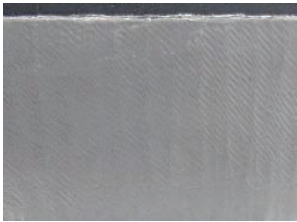

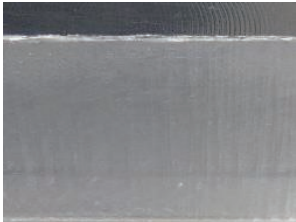


Radius Flute Exit Geometry



Cutting Performance

Comparison of Fracture Resistance - Machining of Slots in A7050

Utilising internal coolant and optimised cutting edge geometry enables double the efficiency levels of conventional products.

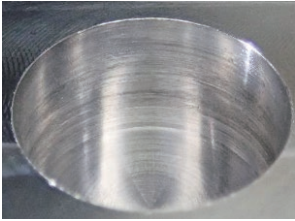
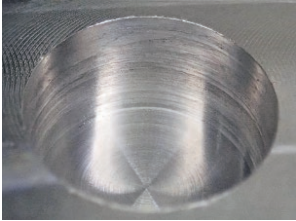
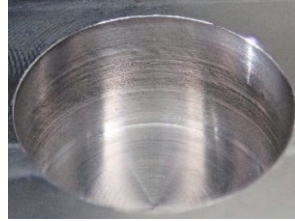
	2550	3020	3500
Feed Rate (mm/min)	2550	3020	3500
Feed per Tooth (mm/t.)	0.32	0.38	0.44
New Alimaster	 ✓ Good Wall Surface	 ✓ Good Wall Surface	 ✓ Good Wall Surface
Conventional A	 ✓ Good Wall Surface	 ✗ Breakage due to chip clogging	
Conventional B			 ✗ Breakage due to chip clogging

<Cutting Conditions>
 Workpiece Material : A7050
 Tool : A3SA120N36C
 DC = ø12 mm
 Cutting Speed : vc = 100m/min
 Depth of Cut : ap = 12mm
 Overhang Length : 36mm
 Cutting Mode : Internal Coolant
 (Water-soluble Coolants)

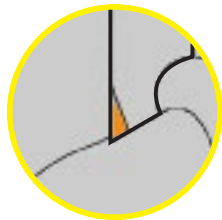
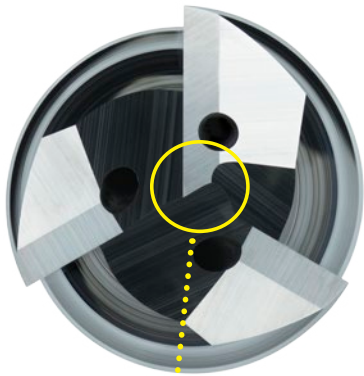
Cutting Performance

Comparison of Fracture Resistance - Plunge Machining of A7050

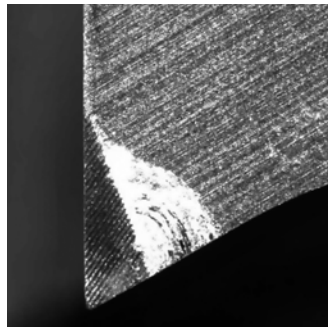
Higher feed rates than conventional products brings greater machining efficiencies.

Feed Rate (mm/min)	1040	1280	1520
Feed per Rev. (mm/rev)	0.13	0.16	0.19
<i>New</i> Alimaster			
	✓	✓	✓

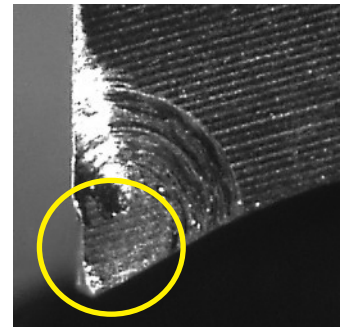
After F=1520 mm/min, fz=0.19 mm/rev Plunging



Strengthened Centre Cutting Edges



New **Alimaster** ✓



Conventional Fracture ✗

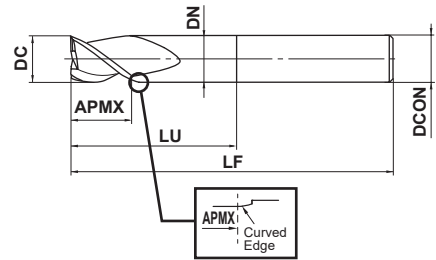
<Cutting Conditions>
 Workpiece Material : A7050
 Tool : A3SA120N36C
 DC = ø12 mm
 Cutting Speed : vc = 300m/min
 Depth of Cut : ap = 12mm
 Overhang Length : 36 mm
 Cutting Mode : Internal Coolant
 (Water-soluble Coolants)

A3SA NEW

End mill, Short cut length, 3 flute, with multiple internal through coolant holes



Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (<=45HRC)	Hardened Steel (<=55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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	DC=12	DC>12			
	0 - 0.020	0 - 0.030			
	12≤DCON≤16	20≤DCON≤25			
	0 - 0.011	0 - 0.013			

- Stability and reliability even when slotting, ramping and plunging.
- The cross sectional geometry of the flutes is perfect for efficient chip discharge.

Order Number	DC	APMX	LU	DN	LF	DCON	No.F*	Stock
A3SA120N36C	12	18	36	11.4	80	12	3	●
A3SA160N48C	16	24	48	15.4	90	16	3	●
A3SA200N55C	20	30	55	18	100	20	3	●
A3SA250N55C	25	37.5	55	23	100	25	3	●

* Number of Flutes

DC = Dia.
 APMX = Length of Cut
 LU = Neck Length
 DN = Neck Dia.
 LF = Overall Length
 DCON = Shank Dia.

● : Inventory maintained in Japan.

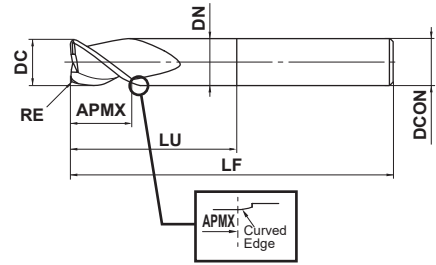
High Efficiency Machining of Aluminium Alloys

A3SARB NEW

Corner radius end mill, Short cut length, 3 flute, with multiple internal through coolant holes



Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (<=45HRC)	Hardened Steel (<=55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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	DC=12	DC>12		
	0 - 0.020	0 - 0.030		
	12≤DCON≤16	20≤DCON≤25		
	0 - 0.011	0 - 0.013		

- Stability and reliability even when slotting, ramping and plunging.
- The cross sectional geometry of the flutes is perfect for efficient chip discharge.

Order Number	DC	RE	APMX	LU	DN	LF	DCON	No.F*	Stock
A3SARB120R100N36C	12	1	18	36	11.4	80	12	3	●
A3SARB120R200N36C	12	2	18	36	11.4	80	12	3	●
A3SARB120R300N36C	12	3	18	36	11.4	80	12	3	●
A3SARB160R200N48C	16	2	24	48	15.4	90	16	3	●
A3SARB160R300N48C	16	3	24	48	15.4	90	16	3	●
A3SARB160R400N48C	16	4	24	48	15.4	90	16	3	●
A3SARB200R200N55C	20	2	30	55	18	100	20	3	●
A3SARB200R300N55C	20	3	30	55	18	100	20	3	●
A3SARB200R400N55C	20	4	30	55	18	100	20	3	●
A3SARB250R200N55C	25	2	37.5	55	23	100	25	3	●
A3SARB250R300N55C	25	3	37.5	55	23	100	25	3	●
A3SARB250R400N55C	25	4	37.5	55	23	100	25	3	●
A3SARB250R500N55C	25	5	37.5	55	23	100	25	3	●

* Number of Flutes

DC = Dia.
 RE = Corner R
 APMX = Length of Cut
 LU = Neck Length
 DN = Neck Dia.
 LF = Overall Length
 DCON = Shank Dia.

● : Inventory maintained in Japan.

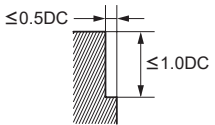
A3SA/A3SARB

Recommended Cutting Conditions

Side Milling

(mm)

Workpiece Material	Aluminium Alloys	
Dia. DC	Revolution (min ⁻¹)	Feed rate (mm/min)
12	≤33000	≤15000
16	≤33000	≤20000
20	≤33000	≤26000
25	≤33000	≤32000

Depth of cut		
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Note 1) Water-soluble cutting fluid is recommended.

Note 2) Climb milling is recommended for side cutting.

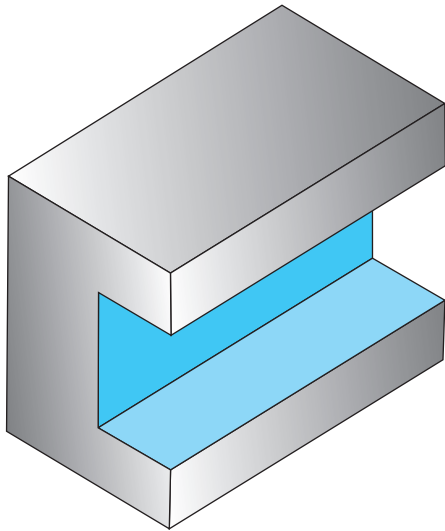
Note 3) When machining with a large tool length protrusion, adjust the the speed, feed and depth of cut as necessary.

Note 4) If the rigidity of the machine or the workpiece materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately within the range described in the above table, or reduce the depth and width of cut.

Cutting Example

Machining with a High-speed, High-output Horizontal 5-axis Machining Centre

Ultra-high efficiency processing was achieved with a stable chip discharge and no chattering.
Metal Removal Rate of 10,000 cm³/min.



<Cutting Conditions>

Workpiece Material : A7050
Tool : A3SARB250R300N55C
DC = \varnothing 25 mm, RE=3.0mm
Spindle Revolution : 33000 min⁻¹
Cutting Speed : vc = 2600 m/min
Feed Rate : f = 25000 mm/min
Feed : fz = 0.25 mm/t.
Depth of Cut : ap = 16 mm, ae=25 mm
Cutting Mode : Internal Coolant
(Water-soluble Coolants)
Machine : For machining aluminium
structural parts for aircraft
High-speed, high-output
horizontal 5-axis M/C

For Your Safety

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or driver. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

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<http://www.mitsubishicarbide.com/en/>
(Tools specifications subject to change without notice.)